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10/663,844	09/17/2003	Byeong-Chul Kim	P56919	2853

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EXAMINER

SCHELL, JOSEPH O

ART UNIT	PAPER NUMBER
2114	

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/663,844	Applicant(s) KIM, BYEONG-CHUL	
	Examiner Joseph Schell	Art Unit 2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### ***Detailed Action***

Claims 1-18 have been examined.

Claims 1-18 have been rejected.

### ***Claim Objections***

1. Claim 1 line 9 should read "managing a status report/record of the primary for the backup unit..." as a position of a CPU is not generally used to mean state or status.
2. Claim 1 line 17 should read "configured to convey data among the plurality of sub-systems..." or something similar, as "distribute processing" implies that processing tasks are being sent to the configuration management unit, the distributed algorithm processing unit, and the shared resource unit for processing within each.
3. Claim 9 line 2 should read "configured to manage process load sharing..."

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-6 are rejected under 35 U.S.C. 112 second paragraph for being indefinite.

Specifically, the limitation recited on lines 13 and 14 of claim 1, "a shared resource unit shared and used in each sub-system and occupied in the primary units" does not appear to make any sense. Paragraph 27 of the specification states "Primary unit receives the certain assigned events from event generating unit to occupy a necessary logical shared resource unit." From the specification, the examiner assumes the shared resource is a shared memory or something similar that is used by an executing processor. In this case "occupied in" should be changed to "used by," which would make the claim redundantly state "used in each sub-system and used by the primary units" but redundancy in claims is not uncommon and it seems to be the most reasonable interpretation of the claim.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 7-9, 12-15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kidder (US Patent 6,694,450) in view of Middleware.

6. As per claim 1, Kidder ('450) discloses a system combined with a load sharing structure and a primary/backup structure, the system having a plurality of sub-systems, the system comprising:

a primary unit disposed in each of said plurality of sub-systems to share an event processing work load according to a load sharing processing order for events (column 4 lines 1-4);

a backup unit disposed in each of said plurality of sub-systems to receive and store only a minimum amount of data that is necessary for restoration from a primary unit in preparation for when a primary unit malfunctions (column 3 lines 43-45, column 4 lines 38-32, column 4 lines 38-40, and column 46 lines 5-9, the primary instance passes its state to a backup instance of a process, that backup instance is located on a backup processor);

a configuration management unit comprising an index mapping each backup unit with corresponding primary units, the configuration management unit managing a position of the primary unit for the backup unit (column 15 lines 22-25, the NMS maps a logical ID with two physical IDs to make a primary and backup);

a distributed algorithm processing unit being programmed and configured to determine which sub-system processes events when the events are generated (column 7 lines 20-22, the processor appear as a single processor, thus the task distribution is done within the system);

a shared resource unit shared and used in each sub-system and occupied in the primary units (the database 42 of Figure 4, each process shares access to it, receiving data only pertinent to the specific process);

an event generating unit being programmed and configured to generate events (column 18 lines 17-19, an application requests ATM processes on the line cards); and

a distributed control environment being programmed and configured to distribute processing among the plurality of sub-systems, the configuration management unit, the distributed algorithm processing unit, and the shared resource unit (as shown in Figure 35A, the switched Ethernet network 544 allows for communication between the NMS which performs configuration and distribution of processing tasks, the database which is a share resource, and the various cards with processors).

Kidder ('450) does not expressly disclose the system wherein the distributed control environment comprises a middleware platform.

Wikipedia's Middleware article briefly describes middleware. At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the distributed processing system disclosed by Kidder ('450) such that a middleware platform is used for inter-processor communication over the switched Ethernet network. This would have been obvious because it allows for more efficient data communication (Middleware, last sentence of the paragraph).

7. As per claim 2, Kidder ('450) in view of Middleware discloses the system of claim 1, each backup unit corresponds to a primary unit that is located in a different sub-system than the backup unit (Kidder ('450) column 4 lines 20-29 and as shown in Figure 31C).

8. As per claim 3, Kidder ('450) in view of Middleware discloses the system of claim 1, the configuration management unit comprising an index for processing load sharing between the primary units and comprising an index mapping each backup unit to a corresponding primary unit stored in the configuration management unit (Kidder ('450) column 17 lines 55-60 describes process distribution and column 15 lines 40-46, primary and backup units are mapped by giving them the same LID).

9. As per claim 7 and 8, these claims recite a subset of the limitations found in claim 1 and are rejected on the same grounds as claim 1.

10. As per claim 9, Kidder ('450) in view of Middleware discloses the system of claim 7, the configuration management unit being programmed and configured process load sharing between the sub-systems (Kidder ('450) column 3 lines 27-31, multiple process instances are created and column 44 lines 14-17, there are multiple primary line cards. Multiple primary line cards imply load sharing).

11. As per claim 12, Kidder ('450) in view of Middleware discloses the system of claim 7, the configuration management unit and the distributed algorithm processing unit being programmed and configured to assign events only to functioning primary units and not to backup units (Kidder ('450) column 3 lines 37-45, soft redundancy is performed by passing a state from the primary process to the backup process and column 46 lines 35-37, backup processes may be limited to backup processors).

12. As per claim 13, Kidder ('450) in view of Middleware discloses the system of claim 7, the configuration management unit and the distributed algorithm processing unit are programmed and configured so that backup units do not participate in load sharing (Kidder ('450) column 3 lines 37-45, soft redundancy is performed by passing a state from the primary process to the backup process and column 46 lines 35-37, backup processes may be limited to backup processors).

13. As per claim 14, Kidder ('450) in view of Middleware discloses the system of claim 8, said backup units storing only an index of events (Kidder ('450) column 3 lines 64 through column 4 line 2, multiple processes are being backed up and the state of a process may need to be synchronized with other processes after failover), an ongoing status of the corresponding primary unit (Kidder ('450) column 4 lines 28-32) and information as to which resources are occupied (Kidder ('450) column 4 lines 49-53, network connections are resources).

14. As per claim 15, this claim recites the same limitations as claim 2 and is rejected on the same grounds as claim 2.

16. As per claim 17, Kidder ('450) in view of Middleware discloses the system of claim 7, the configuration management unit being programmed and configured to generate a new primary unit and a new backup unit when a new sub-system is added to the system (Kidder ('450) column 24 lines 39-43, new cards with processors may be added; column 24 line 65 through column 25 line 6, they are assigned PIDs and LIDs; the LIDs are used for processor pairing, as shown in column 15 lines 23-27).

17. As per claim 18, Kidder ('450) in view of Middleware discloses the system of claim 17, the configuration management unit being programmed and configured to reconfigure which primary units correspond to which backup units when a new sub-system is added to the system and a new primary unit and a new backup unit are generated (Kidder ('450) column 24 line 63 through column 25 line 6, a configuration change is implemented (column 25 line 5) after new hardware is added).

19. Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kidder ('450) in view of Middleware and in further view of Woster (US Patent 5,892,946).

20. As per claim 4, Kidder ('450) in view of Middleware discloses the system of claim 1. Kidder ('450) in view of Middleware does not explicitly disclose the distributed algorithm processing unit being programmed and configured to assign generated events in a round robin fashion to the primary units.

Woster ('946) teaches a distributed server system that uses a round robin algorithm to assign server requests when available nodes are in the same service state(see abstract and column 5 lines 64-66).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kidder ('450) in view of Middleware such that task distribution is done to the primary units in a round robin fashion. This modification would have been obvious because round robin allows for equal distribution of service requests among the available servers (Kidder ('450) column 5 lines 64-66).

21. As per claim 10, this claim recites the same limitations as claim 4 and is rejected on the same grounds as claim 4.

22. Claims 5, 6, 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kidder ('450) in view of Middleware and in further view of Decentralized Load Balancing Algorithm (IBM Technical Disclosure Bulletin NA9112221 from December, 1991).

23. As per claim 5, Kidder ('450) in view of Middleware discloses the system of claim 1. Kidder ('450) in view of Middleware does not explicitly disclose the distributed algorithm processing unit being programmed and configured to assign generated events to primary units that are the least congested.

Decentralized Load Balancing Algorithm teaches an algorithm for distributing processing tasks among an array of processors.

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kidder ('450) in view of Middleware such that tasks are assigned to primary units that are the least used. This would have been obvious because equal loading of nodes in a system provides a speedup as close to the ideal as is feasible (Decentralized Load Balancing, third sentence).

24. As per claim 6, Kidder ('450) in view of Middleware discloses the system of claim 1. Kidder ('450) in view of Middleware does not explicitly disclose the system wherein the distributed algorithm processing unit is programmed and configured to calculate load sharing between the primary units and to assign newly generated event to a primary unit based on said calculation.

Decentralized Load Balancing Algorithm teaches an algorithm wherein a selected node examines its surrounding nodes (about the middle after “Our load balancing criterion is a local one”) and then balances the workload of the surrounding nodes (two-thirds of the way down, after BALANCING A H-NEIGHBORHOOD).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kidder ('450) in view of Middleware such that load sharing is calculated and newly generated events are assigned based on this calculation. This modification would have been obvious because equal loading of nodes in a system provides a speedup as close to the ideal as is feasible (Decentralized Load Balancing, third sentence) and a load sharing calculation needs to be performed for a processor to know whether a load is balanced or where an imbalance lies (Decentralized Load Balancing, about the middle after “Our load balancing criterion is a local one”).

25. As per claim 11, this claim recites the same limitations as claim 5 and is rejected on the same grounds as claim 5.

26. As per claim 16, Kidder ('450) in view of Middleware discloses the system of claim 7.

Kidder ('450) in view of Middleware does not explicitly disclose the system wherein the component management unit and the distributed algorithm processing unit are

programmed and configured to assign newly generated events to a primary unit in a sub-system that is least congested.

Decentralized Load Balancing Algorithm teaches an algorithm for distributing processing tasks among an array of processors.

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kidder ('450) in view of Middleware such that tasks are assigned to primary units that are the least used. This would have been obvious because equal loading of nodes in a system provides a speedup as close to the ideal as is feasible (Decentralized Load Balancing, third sentence).

### ***Conclusion***

The prior art made of record on accompanying PTO 892 form and not relied upon is considered pertinent to applicant's disclosure. Specifically, Greenstein ('205) teaches a distributed processor system with cluster failover to another cluster.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Schell whose telephone number is (571) 272-8186. The examiner can normally be reached on Monday through Friday 9AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS

  
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